

WE CLAIM:

1. A purified recombinant glycopolypeptide of about 65kd to about 100kd that comprises approximately 40% to 60% carbohydrate by weight and that can strongly bind human spermatozoa and induce an acrosome reaction in the spermatozoa.

2. The glycoprotein of claim 1, wherein the glycoprotein is produced by a human ovarian cell line.

3. A process for producing a glycopolypeptide having the biological activity of hZP3 protein, comprising the steps of:

- (a) transducing a cell from a human ovarian cell line with a polynucleotide that encodes polypeptide comprising SEQ ID NO:1;
- (b) establishing a stable-transfected cell culture for producing the glycopolypeptide; and
- (c) isolating the glycopolypeptide from the cell culture.

4. The process of claim 3, wherein the ovarian cell line is PA-1.

5. The process of claim 3, wherein the polynucleotide encodes a polypeptide comprising the hZP3 sequence.

6. A glycopolypeptide having between 41 and 400 amino acids and having an active portion that preferentially binds to human sperm, wherein the active portion comprises an amino acid sequence that is more than 54% homologous with SEQ ID NO: 1 and has a predicted O-glycosylation site at a serine five positions from the carboxyl terminus of the active portion.

7. The glycopolypeptide of claim 6, wherein the amino acid sequence of the active portion is more than 75% identical with SEQ ID NO: 1.

8. The glycopolypeptide of claim 6, having between 41 and 300 amino acids.

9. The glycopolypeptide of claim 6, having between 41 and 200 amino acids.

10. The glycopolypeptide of claim 6, having between 41 and 100 amino acids.

11. The glycopolypeptide of claim 6, having between 41 and 65 amino acids.

12. A method of detecting male infertility from a human spermatozoa sample, comprising the steps of:

(a) contacting purified recombinant glycopolypeptide of about 65kd to about 100kd that comprises approximately 50% carbohydrate and that can strongly bind to human spermatozoa and induce an acrosome reaction, with spermatozoa from the sample to form an admixture;

(b) detecting biological activity of the spermatozoa in the admixture; and

(c) comparing the biological activity with a reference value.

13. The method of claim 12, wherein step (b) further comprises adding *Pisum Satvum* agglutinin to the admixture.

14. The method of claim 12, wherein the recombinant glycopolypeptide is immobilized onto a solid phase.

15. The method of claim 12, wherein the recombinant glycopolypeptide is made by expression in a human ovarian cell line.

16. The method of claim 12, wherein the human ovarian cell line is PA-1.

17. A nucleic acid vector useful for producing a glycopolypeptide smaller than 300 amino acids long, wherein the glycopolypeptide specifically binds to human sperm and the vector codes for an active amino acid sequence portion that is more than 54% identical with SEQ ID NO: 1.

18. The vector of claim 17, wherein the active amino acid sequence portion is more than 75% identical with SEQ ID NO: 1.

19. The vector of claim 17, wherein the active amino acid sequence portion is 100% identical with SEQ ID NO: 1.

20. A human ovarian cell containing a nucleic acid vector useful for producing a glycopolypeptide less than 300 amino acids long, wherein the glycopolypeptide strongly

21. The human cell of claim 20, wherein the amino acid sequence portion is identical with SEQ ID NO: 1.

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